Mountain View
Environmental Sustainability Task Force

Baseline and Measurements Working Group

Final Report—First Draft

July 3, 2008

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Introduction

In 2007, the Mountain View City Council signed the U.S. Mayor's Climate Protection Agreement and approved the funds for the City of Mountain View to join ICLEI, an international membership association of local governments dedicated to addressing environmental issues through local action. ICLEI provides programs, tools, software assistance and technical expertise to help local governments quantify and reduce their green house gas emissions.

One of the reasons for joining ICLEI was to obtain the tools and expertise necessary to estimate the amount of greenhouse gas (GHG) that the community of Mountain View is contributing to climate change. The method involves first selecting a baseline year and then estimating the amount of GHG produced in Mountain View in that year using data available from electric and gas utilities, planning and transportations agencies and solid waste management departments.

City Staff selected the year 2005 as the baseline year, obtained the data necessary to estimate the GHG emissions for 2005 and made the calculations for the initial baseline year GHG emissions estimate.

When the Environmental Sustainability Task Force was formed in January, 2008, the Baseline and Measurements Working Group was formed to evaluate the GHG emissions for the community of Mountain View and to recommend further action regarding periodic measurement. This working group used the city staff baseline estimate of Mountain View's GHG emissions for the year 2005 as the starting point for its efforts.

Objectives

The beginning objectives of the Baseline and Measurement Working Group were to:

- Consistent with AB 32, recommend CO2e reduction targets for the city.
- Recommend a mix of reductions, and possibly offsets, by major category.
- Identify/evaluate a baseline measuring tool to verify or endorse the city's CO2e calculations.
- Recommend an interval and a measuring tool that the city should use to measure its progress and update its strategy for achieving the goals.
- Recommend at least one "CO2e footprint" calculator for each of the following: citizens, businesses, and government.

ACRONYMS:
GHG = GreenHouse Gases
CO2 = Carbon Dioxide
CO2e = CO2 equivalent, including methane and other GHGs

Organization of Report

The Baseline and Measurements Working Group developed recommendations in five basic areas. Each recommendation area has a section devoted to it and, for some, sub recommendations within the area. The five basic recommendations that were considered by the Working Group are:

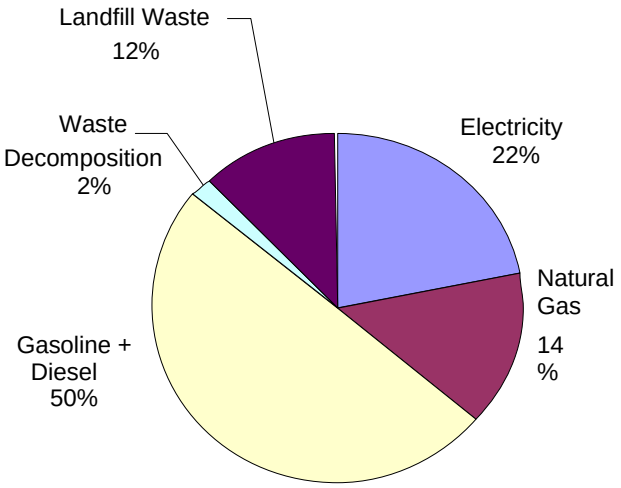
Recommendation #1: CO_2e Emissions Goals

Statement of Issue

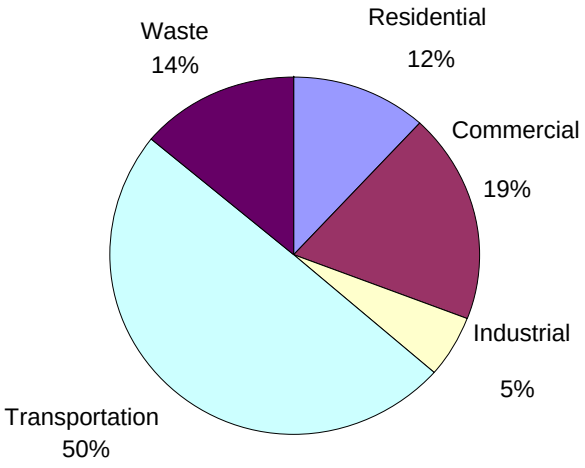
The City of Mountain View and its community recognize that global warming is a serious threat to our well being, economic prosperity and natural environment. California is the 12th largest emitter of greenhouse gases in the world due to its large and growing economy (1). On August 31, 2006, the California Legislature passed The Global Warming Solutions Act of 2006, commonly known as AB 32. AB 32 calls for the state of California to reduce greenhouse gas (GHG) emissions to 1990 levels by the year 2020—approximately a 25 percent reduction over forecast levels and 10 percent below the 2006 level of 500 million metric tons a year.

To be a responsible community member, the City of Mountain View and its citizens need to participate in personal, local and global efforts to reduce GHG emissions. Mountain View's 2005 greenhouse gas inventory estimates that the community-wide GHG emissions total approximately 846,146 metric tons CO_2e(3), or 11.77 metric tons CO_2e per person (2)(3). The pie charts below show Mountain View's 2005 GHG emissions by source and by sector.

Emissions by Source



Emissions by Sector



Recommendation #1

The Baseline and Measurements committee recommends adopting specific goals/targets for Mountain View city government and the broader community. The recommended goals and targets are discussed in the next section.

Environmental Impact

1-1. **Set greenhouse gas emission reduction targets as follows:**

a. A 5% reduction from 2005 baseline community levels by 2012. This would equal a reduction of 42,307 metric tons CO2e. The expected 2012 GHG emissions would be 803,839 metric tons CO2e or 10.54 metric tons CO2e per capita (4).

b. A 10% reduction from 2005 baseline community levels by 2016. This would equal a reduction of 84,615 metric tons CO2e. The expected 2016 GHG emissions would be 761,531 metric tons CO2e or 9.67 metric tons CO2e per capita(5).

c. A 15% reduction from 2005 baseline community levels by 2020. This would equal a reduction of 126,922 metric tons CO2e. The expected 2020 GHG emissions would be 719,224 metric tons CO2e or 8.84 metric tons CO2e per capita(6).

d. An 80% reduction from 2005 baseline community levels by 2050. This would equal a reduction of 676,917 metric tons CO2e. The expected 2050 GHG emissions would be 169,229 metric tons of CO2e.

The targets above were chosen for the following reasons. First and foremost, the Baseline and Measurement Working Group recognizes that global warming is a serious threat to humankind and therefore believes it is necessary to set aggressive goals in combating it. Second, these reductions would meet and exceed California's AB 32 requirements. In fact, Mountain View would exceed California's AB 32 requirement by 2016 if it met its second target of 10%. Third, they are in line with other cities' targets (see Table 1-1 below). Fourth, they embody a challenge commensurate with the environmental and entrepreneurial spirit of Mountain View residents.

1-2. Other ESTF Working Groups provide Sector- or Source-specific goals in their appropriate areas.

To help start this process, Appendix 1 at the end of the report shows two sets of numbers: (1) The projected GHG emissions by Sector and Source for 2008, 2012, 2016 and 2020 if these emissions were to grow at the current per capita rate of 11.77 metric tons and in the exact same proportions as the baseline 2005 emissions. (2) The projected GHG emissions if every sector or source reduced its emissions by 5%, 10% and 15% by 2012, 2016, and 2020, respectively, in line with the recommendations above.

1-3. The City of Mountain View measure the community's progress towards these goals in 2010, 2013, 2017, and 2021 by continuing to use ICLEI methodology so as to provide consistency with its 2005 baseline measurement, and that efforts prioritize reductions in CO_2e over offsets.

We anticipate this task to take three months total of one city employee's time. In addition, the ICLEI software required to do this assessment has a cost associated with it. It is believed that this cost is $1200, but this needs to be confirmed.

Table 1-1. Sustainability and Greenhouse Gas Emission Targets by City

City	Year	Stated Emission Goals
Portland, OR (7)	2010	10% below 1990 levels
	2030	40% below 1990 levels
	2050	80% below 1990 levels
San Mateo, CA(8)	2009	below 2006 levels
	2020	below 1990 levels
	2050	80% below 1990 levels
Berkeley, CA(9)	2009	2% annual reduction from previous year
	2020	33% below 2000 levels
	2050	80% below 2000 levels
Palo Alto, CA(10)	2009	city operations reduced 5% below 2005 levels
	2012	city and community reduce 5% below 2005 levels
	2020	city and community reduce 15% below 2005 levels
San Jose, CA(11)	2015	Reduce per capita energy use by 50% Receive 100% of our electrical power from clean renewable sources Build or retrofit 50 million square feet of green buildings Divert 100 % of waste from our landfill and convert waste to energy Recycle or beneficially reuse 100% of our wastewater (100 million gallons per day)

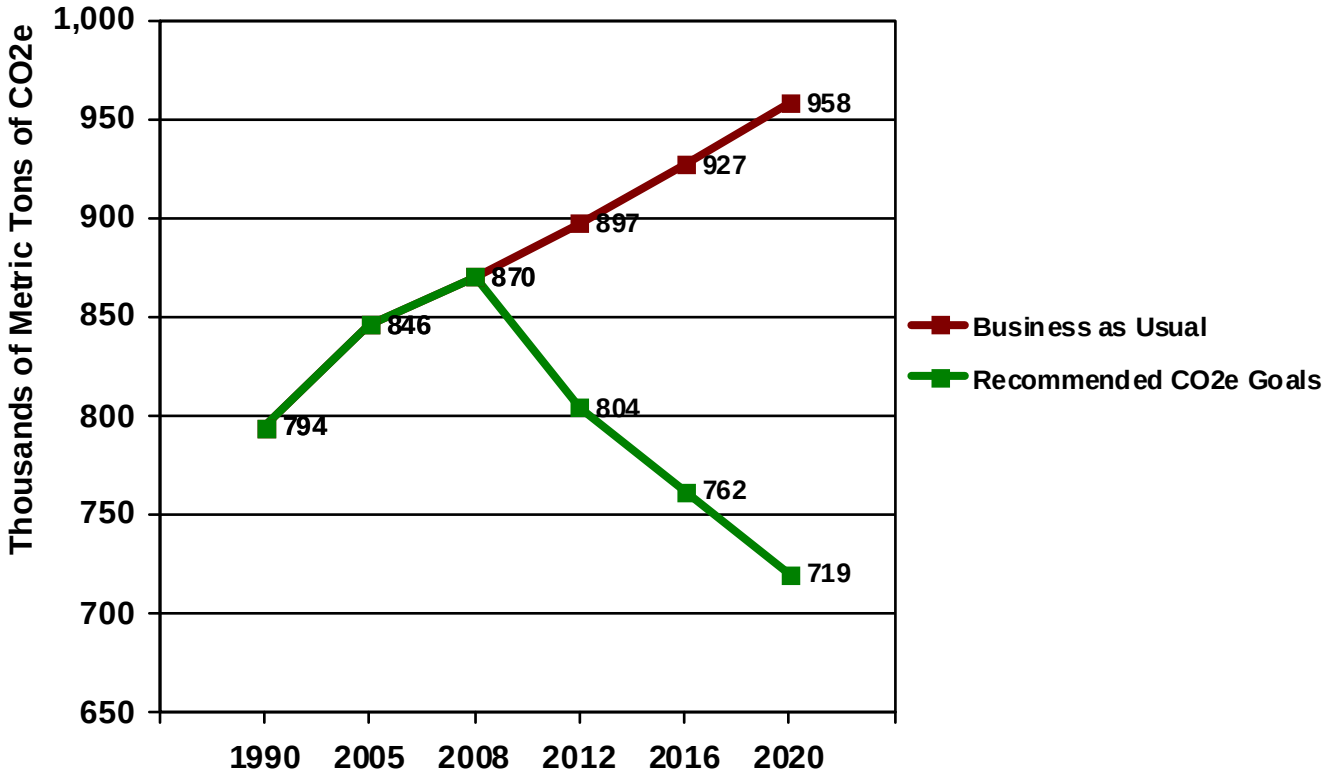
If the Mountain View community continues with business as usual

According to the Association of Bay Area Governments (ABAG), the population of Mountain View is expected to be 88,300 by 2030 or grow at approximately 0.82% a year. This would be a 19% increase from Mountain View's current 2008 population (73,932) or an increase of approximately 15,000 people. If Mountain View's GHG emissions remain at 11.77 metric tons per person, then Mountain View's GHG emissions will also increase by 19%. See Table 1-2 and Graph 1-1.

Table 1-2. Comparison of Business as Usual GHG Emissions with Recommended Target Reductions

Year	**Population**	**Business as Usual CO_2e metric tons**	**Recommended CO_2e metric tons**
1990	67,500	794,004	794,004
2005	71,890	846,146	846,146
2008	73,932	870,180	870,180
2012	76,234	**897,275**	**803,839**
2016	78,764	**927,053**	**761,531**
2020	81,378	**957,820**	**719,224**

Graph 1-1: Comparison of Business as Usual GHG Emissions with Recommended Target Reductions



Other considerations

It should also be noted that the Governor has set a target for 80% reduction of emissions from 1990 levels by 2050. If the Mountain View community chooses to meet the first three targets, the community will have to cut emissions much more after 2020 than before 2020. However, we hope that by 2020 there will be momentum at the community, state and federal level and this gap will be easier to close by then.

Fiscal Impact

The exact fiscal impact of this recommendation depends on the specific measures undertaken to reduce carbon emissions, and on the measures which are not undertaken and therefore contribute to accelerated climate change with its attendant fiscal risk. Recommendations for emissions reduction measures are the topic of the reports from other Mountain View ESTF Working Groups, and therefore these reports should be consulted for more information on the fiscal impact of specific measures.

Obstacles

The City of Mountain View could fail to meet these emissions reduction targets, even if agreed to by the City Council, due to lack of follow up action to introduce specific emissions reduction measures. Lack of public support could also result in the failure to meet emission reduction targets even if

measures are introduced. Finally, the sector contributing the largest amount of emissions, Transportation, is not easily influenced by City public policy decisions, since many trips through Mountain View are not by city residents. Regional organizations such as the Association of Bay Area Governments (ABAG) can also contribute to introducing policies that reduce emissions. Decisive action may require national and state initiatives. Other sectors may also exhibit a lack of the ability of the City to influence emissions reductions to a lesser degree.

Partnerships

There are many potential nonprofits that could act as partners for helping to reduce carbon emissions. Some of them are the Sierra Club's Cool Cities campaign, Mountain View Trees, Acterra, etc. In addition, Mountain View can and should co-ordinate with other cities in our area, especially our neighbors in Palo Alto, Los Altos, and Sunnyvale. Finally, Mountain View City government should be active in various regional, state, and national local government organizations, such as ABAG, to keep the topic of emissions reductions at the top of local government agendas to ensure that real and meaningful reductions occur.

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Recommendation #2: CO2e Measurement Methodology

Statement of Issue

Given that there are no precise measurements of past (or even current) CO2 and CO2e (CO2 equivalent) emissions by the city, what methodology should we use? If we use ICLEI, how do we deal with the weakness(es) in ICLEI's methodology?

How do we avoid overstating or understating progress? There are ways to reduce local emissions by moving emissions elsewhere. As an example, if an energy-intensive company moved from Mountain View to another location, its CO2 emissions would no longer show up on our tally sheet, but emissions would not actually have been reduced. As another example, much of the trash in Mountain View's landfill is from San Francisco. Over time, emissions from this landfill will gradually shrink (since any material that has fully decomposed will no longer emit more methane). The city could make its tally sheet look more favorable simply by doing nothing and waiting for methane emissions to shrink, but this would not represent any real solution to the problem (13).

Recommendation #2

We must measure and reduce all significant factors that contribute to global warming. Because all GHG (GreenHouse Gas) emissions matter as far as the planet is concerned**, the city should measure and reduce CO2e (CO2 equivalent)**, not just CO2, even if A.B. 32 specifies only CO2.

If non-GHG contributors to global warming are found (e.g. changes in albedo (reflectivity of the surface of the earth due to changes in vegetation and structures)), we should measure and reduce those, too.

Although we find at least one major omission in the ICLEI methodology (air travel), we have not found a better methodology, and we do not believe that we part-time non-experts can produce a better methodology in a realistic amount of time.

- We therefore recommend using ICLEI, with the following provisos:
  1) The city should keep open the possibility of using improved methodologies in the future.
  2) The city should attempt to measure/estimate air travel. If we find other significant emissions that are omitted from ICLEI, we should consider measuring/estimating (and reducing) those.
  3) The city shall not deliberately "move" emissions outside the city boundary to meet the state requirements. (In the long run, the city should attempt to measure and, more importantly, reduce its emissions outside the city boundaries (e.g. emissions from food and industrial products that are made outside the city and then imported into the city). However, we do not yet have a reliable methodology for doing this.)
  4) The city shall not count "unearned" reductions, such as natural the tapering off of emissions from the landfill.
  5) When presenting emissions measurements, we recommend adding the following columns:
     a. The input data, for example, kwH electricity
     b. The ICLEI conversion factor, if the ICLEI method is used
     c. The source of the input data, for example, PG&E 2005
     d. Any assumptions in the collection of data or calculations

These recommendations apply to the short term and the long term.

Environmental Impact

Although there is no significant direct environmental impact from merely choosing a methodology, there are indirect impacts because if we choose measurement methodologies that understate the problem or overstate progress, then we probably reduce the problem by a smaller amount.

1) The real environmental impact is from all GHGs and we should measure and reduce the total "load" we are putting on the environment. This is the only way to reduce the real problem.
2) Failure to follow this recommendation will give the illusion of progress where there is none.

Fiscal Impact

ICLEI and any other measurement methodologies will cost an unknown but significant amount of money. The annual cost for using ICLEI software is $1200. The cost of staff time is probably much more, but not known at this time. The estimate is 3 months of part time city staff time to prepare a carbon audit using ICLEI.

Obstacles

- There is no practical technique for directly measuring each emission source in Mountain View. Any current method is an estimate.
- We do not yet know all the factors involved. Since indirect emissions are usually difficult to measure, it will be difficult to avoid occasional accidental violation of this recommendation. However, the city can avoid any deliberate effort to misrepresent its emissions.
- The more factors that we try to measure or estimate, the more the measurement process itself will cost.
- Even gathering data may be a non-trivial expense in terms of city staff time.
- Surveys to determine such things as air travel run the risk of non-representative sampling, bias (unintended or intended) in the wording of the questions, and unreliable memory or deliberate misstatements on the part of those surveyed.
- Mountain View's emissions should include indirect emissions (such as emissions caused by producing products that are consumed inside Mountain View but are emitted outside Mountain View), but this can be calculated only with global cooperation, since we consume products produced around the world. (Conversely, emissions for products that we produce but that are consumed elsewhere should in many/most/all cases not be counted as part of our emissions, but this would be difficult to measure/estimate.)
- Ultimately, our goal is not to measure precisely, but to reduce emissions, and every dollar spent on getting more precise measurements/estimates is a dollar not spent on actually reducing emissions.

Partnerships

The city will be working together with ICLEI on measuring emissions.

Contact Information

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Recommendation #3: Measure Emissions Due to Air Travel

Statement of Issue

- Although CO2 emissions due to air travel are relatively easy to measure, ICLEI omits them.
- Air travel CO2 emissions are approximately ½ ton per person in the U.S.
- Air travel emissions are growing rapidly -- even faster than many other emissions. From 1960 to 2005, U.S. air travel passenger miles increased by a factor of about 17 – much faster than population and income combined (14).
- In principle, these emissions are relatively easy to reduce, since almost all air travel is a "luxury" – personal air travel is usually for pleasure, and most business air travel can be replaced with teleconferencing, etc.

Recommendation #3

- The city should measure and reduce emissions due to air travel by residents, business employees, and city government employees.
- Airlines should provide aggregate data on miles traveled (preferably fuel burned and CO2 emitted) by ticket purchasers by city. (Each airline already has this information in their databases and probably already runs very similar queries for marketing purposes.) (15). The state or federal government would probably need to mandate this, so Mountain View should ask ABAG to request the state require this for all airlines that have flights landing or taking off in California.

Environmental Impact

Airplanes emit large quantities of CO2. Emissions per Mountain View resident probably exceed 42,000 metric tons of CO2 (0.6 metric tons per Mountain View resident) per year. This is at least 5% of the estimated emissions per resident and may be considerably more. This does not include business travel by people who work in, but do not live in, the city. Please see Appendix 2 at the end of the report for detailed calculations.

Fiscal Impact

The cost for each airline to run a query of their existing data and provide the figure in passenger miles is probably trivial. Someone would need to aggregate that data for all airlines and provide it in an easily-accessible form (most likely a table on a website and in a spreadsheet). If the airlines co-operate (voluntarily or under legislative order), this could probably be done for only several hundred dollars per year for the entire state (only a few dollars per city). Converting passenger miles to approximate CO2 emissions is trivial; we've included a calculation based on national averages of passenger miles traveled and Mountain View's population.

The cost of actually changing the amount of air travel is unknown.

Obstacles

Although estimating air travel's impact on global warming is easy, and although very little air travel is "necessary", reducing air travel will face the usual difficulties in changing people's behavior.

- In developed countries, air travel is growing faster than population and income combined, which shows that people value it fairly highly among non-necessities.
- "Pleasure" travel includes not only sight-seeing, but also visiting family, and many people do not think of visiting family as a "luxury".

Fortunately, rising fuel costs (and thus ticket prices) could reduce air travel. Anything that the city can do to encourage the state and federal governments to reduce subsidies for air travel and fossil fuels will help.

Partnerships

MV should partner with other cities (via ABAG and other inter-governmental groups) to ask the state to require airlines to provide aggregated passenger-miles-per-city information.

Once the airlines provide info, a non-profit organization, such as Acterra, EDF, etc. could sum up the data and post it.

Contact Information

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Recommendation #4: City Web Page on Individual/Business Action for Carbon Reduction with Links to Carbon Calculators

Statement of Issue

Many individuals and businesses are interested in taking action to reduce carbon independently of any specific program or incentive. These actions may include trying to estimate their carbon footprint, taking action to reduce their carbon emissions, and buying renewable energy credits or other means of offsetting their carbon emissions. While such efforts won't be enough to completely address the problem, the city should encourage these "early adopter" individual and business efforts since they are an important contribution and also they serve as a motivating factor for others who are waiting before taking action

Recommendation #4

The city should develop a Web page that encourages Mountain View residents and businesses to measure their carbon footprint and to take action towards reducing it. The Web page should also encourage individuals with means and profitable businesses to buy carbon credits. Most carbon credits are tax deductable. A link to the page should be put on Mountain View's home page. The existence of the Web page should be widely advertised at appropriate events, such as summer fairs and in the press, and in city venues such as the library. Teachers should be encouraged to give handouts with the URL on it during lessons on environmental matters, so students can bring the information to families.

There are many carbon calculators available; many of them give incomplete or confusing results. The carbon offsets offered often are not tax deductable or have other problems, like they are made for projects that are already underway. The following links are recommended for the page as the calculators are complete and the carbon offsets seem credible:

1) http://www.carbonconcierge.com/ - Contains information on how businesses and individuals can reduce their carbon footprint as well as a link to a carbon calculator with the opportunity to buy tax-deductible carbon credits. The carbon calculator covers home electricity and heating, automobile travel, and air travel.

2) http://www.acterra.org – Acterra is a local environmental group with a carbon calculator for individuals. They seem to have fewer resources for businesses. Their carbon calculator covers home electricity and heating, automobile travel, and air travel.

3) http://www.pge.com/myhome/environment/whatyoucando/climatesmart/ - This is PG&E's program for carbon offset. PG&E customers can buy carbon offsets directly from PG&E. This also lists on their bill what the carbon impact of their energy use is. The offsets are tax deductible. Having the offsets applied directly to the individual energy bill is an especially easy way for people to buy carbon offsets.

Environmental Impact

No direct impact, but a Web page could indirectly help reduce or offset carbon emissions by helping individuals and businesses learn how they can reduce or offset emissions.

Fiscal Impact

Figuring it takes a Web programmer one day to generate the page, at $100 an hour, around $800. This is probably pessimistic though, since the page should be easy to generate and might take no longer than a couple hours.

Obstacles

It is hard to see what could militate against this step.

Partnerships

The city may want to enter into a more formal partnership with Acterra, for example, partnering with them to develop more resources for businesses that want to reduce their carbon footprint. Beyond a simple Web page, this would allow Acterra to go into a business and work with them on carbon reduction measures.

Contact Information

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Recommendation #5: Graphical Representation of Consumer Water Usage Over Time on Water Bill

Statement of Issue

Current water bills give a very rudimentary comparison of usage over time. This makes it very difficult for the average consumer to assess their usage of water over time. Consequently, this makes it difficult to measure progress in water reduction for each household or business. The ability to assess progress or lack of progress over time against water reduction objectives is critical for the city to achieve its overall objectives.

Recommendation #5

The City Water Department should add a simple graph to water bills that will allow a billing period to billing period comparison as well as a year to year comparison of usage over time. A set of simple examples measuring energy used is included at the end of Recommendation 6. A similar set of graphs should be developed for water usage. Also, the bill should contain a notification if the user is in the top 10% of users for both residential and business customers. This notification should be for both the billing period and for yearly consumption.

Environmental Impact

By giving a simple, graphical representation of energy and water usage over time each household and business in the city will be better able to assess their usage over time. This will enable them to better assess which conservation steps are most effective.

Fiscal Impact

After the initial investment in the software upgrade there would be no long term financial impact to the city.

Obstacles

There would be a small initial cost to design, write, and test the software to generate the graphs for these tables.

Partnerships

This recommendation can be implemented entirely by the City government as part of city operations.

Contact Information

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Recommendation #6: Graphical Representation of Consumer Energy Usage over Time on PG&E Bill

Statement of Issue

Current PG&E bills give a very rudimentary comparison of usage over time. This makes it very difficult for the average consumer to assess their usage of energy over time. Consequently, this makes it difficult to measure progress in energy reduction for each household or business. The ability to assess progress or lack of progress over time against energy reduction objectives is critical for the city to achieve its overall objectives.

Recommendation #6

PG&E should add a simple graph to energy and water bills that will allow a month to month comparison as well as a year to year comparison of usage over time. A set of simple examples is attached below. Also, the bill should contain a notification if the user is in the top 10% of users for both residential and business customers. This notification should be for both the billing period and for yearly consumption.

The bill should also contain a graphical representation of the customer's usage over or under the baseline level for the customer's particular area. Also, a clear explanation of how the baseline measure was calculated should be presented in the bill. This information should emphasize the economic benefits to the customer for staying under the baseline usage level.

Lastly, the bills should explain the tons of CO2e that their energy consumption produces both monthly and yearly, and the importance of reducing that consumption. Recommendations should be made as to offsets that could be purchased.

Environmental Impact

By giving a simple, graphical representation of energy usage over time each household and business in the city will be better able to assess their usage over time. This will enable them to better assess which conservation steps are most effective.

Fiscal Impact

After the initial investment in the software upgrade there would be no long term financial impact to the city or to PG&E.

Obstacles

There would be a small initial cost to PG&E to design, write, and test the software to generate the graphs for these tables and to redesign the customer bills.

Partnerships

The co-operation of PG&E will be required to institute this recommendation.

Contact Information

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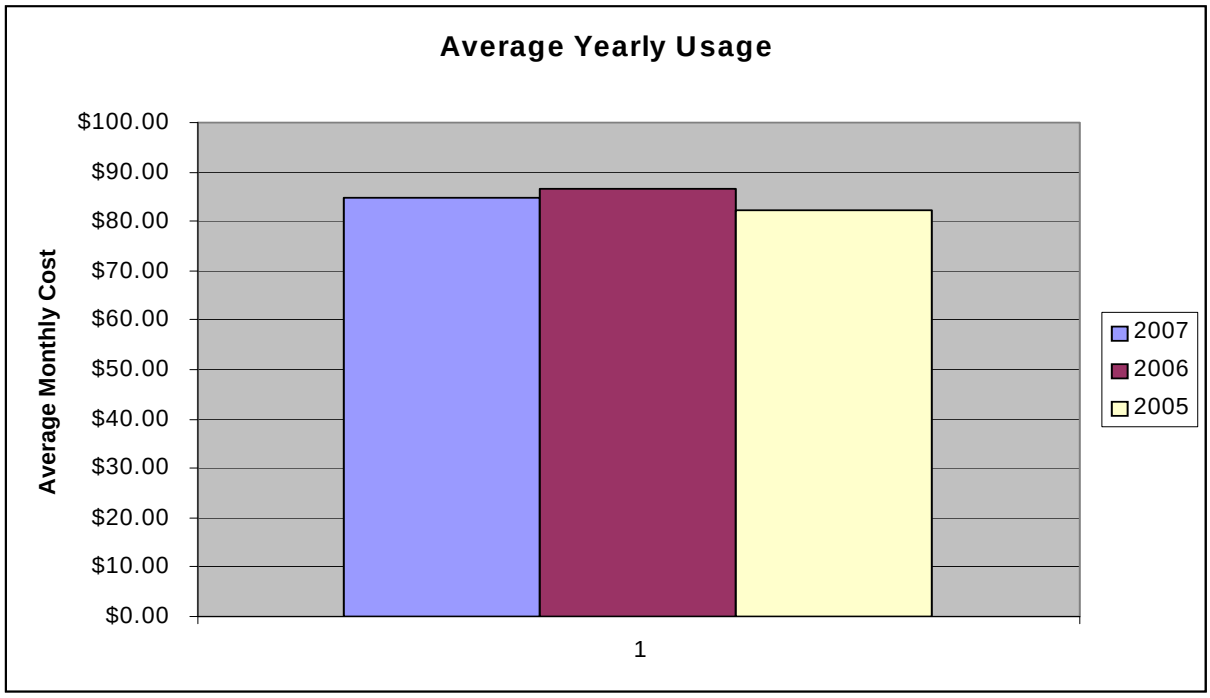

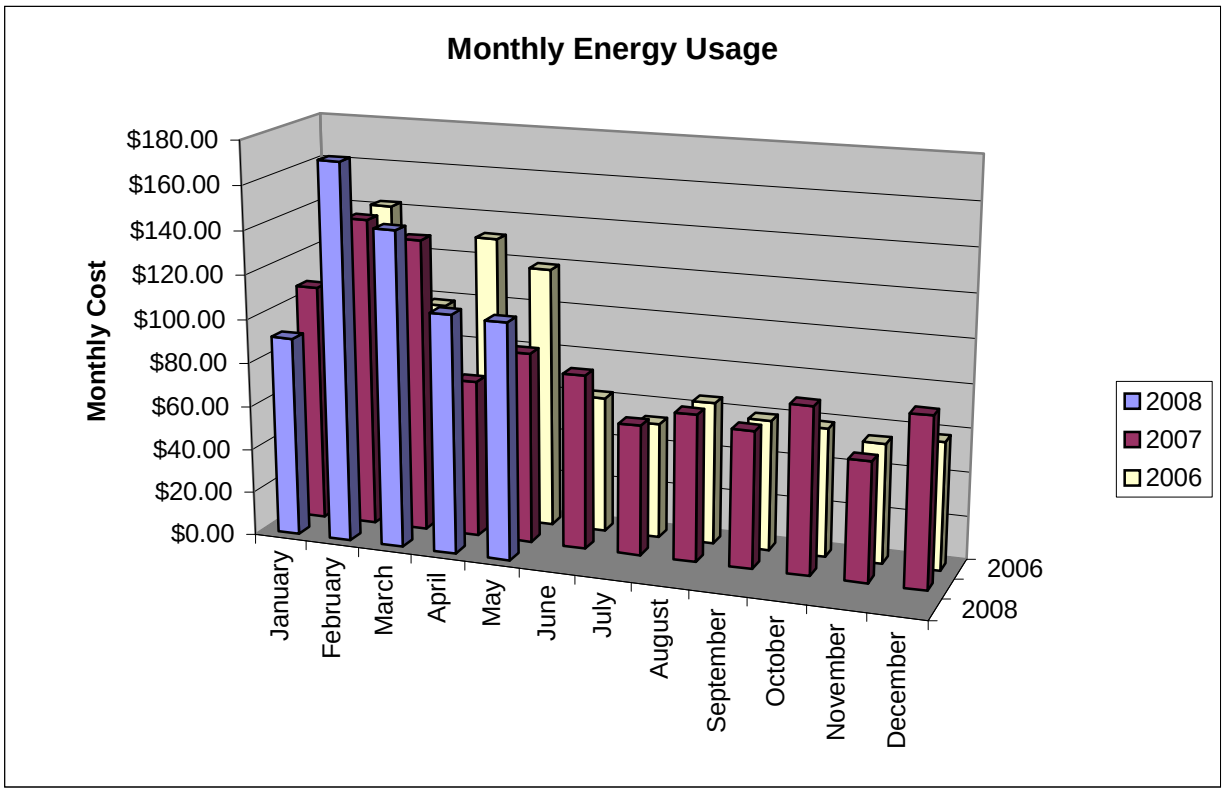

Recommendation #7: Include emissions from air traffic at Moffett Field in the Mountain View community carbon inventory

Statement of Issue

Carbon emissions from air traffic are one of the fastest growing sources of greenhouse gas emissions, and one of the hardest to avoid. Unlike other sources, there are often no good alternatives to air travel other than not flying. Measuring carbon emissions and counting them toward community inventories in those jurisdictions that have airports therefore becomes critical for maintaining accountability. San Jose and Oakland, both of which use the same ICLEI method that Mountain View uses, have decided to include emissions from their airports into their community inventories. Mountain View should do the same for our airport, Moffett Field.

Recommendation #7

We recommend that Mountain View include emissions from air traffic that utilizes Moffett Field for refueling into Mountain View's community carbon inventory. The inventory should only include nonmilitary traffic, since Mountain View can't influence military traffic usage, unless it is impossible to differentiate military from nonmilitary fuel usage.

The emissions should be measured in the following manner:

1) Fuel use data for the year in which the inventory is being calculated should be obtained from Moffett Field administration (currently NASA).
2) The fuel use should be multiplied by an ICLEI carbon emissions conversion factor to convert from gallons of fuel to metric tons of carbon. If Moffett supplies more than one type of aviation fuel, then conversion factors should be obtained for all of them and each type should be listed as a separate line item in the inventory.
3) The resulting carbon emissions should be listed in the ICLEI carbon inventory spreadsheet under the "Misc." category (miscellaneous).

If ICLEI ever modifies their measurement method to include carbon emissions from airports, Mountain View should also adopt that method.

The 2005 carbon inventory should be updated to include emissions from Moffett Field.

Finally, given the difficulty of reducing carbon emissions from air travel directly, if Mountain View decides to offset government operations carbon emissions, Mountain View should purchase carbon offsets or Renewable Energy Credits (RECs) to cover the carbon emitted by Moffett Field air traffic. Depending on US government policy, reimbursement from the federal government may be possible.

Environmental Impact

Measuring carbon emissions will have two effects:

1) Periodically, proposals have been made in the past for expanding the role of Moffett Field (cargo, general aviation, etc.). When such proposals are made in the future, carbon emissions

will be included into any environmental impact report involving expanded Moffett operations and will therefore be an important criterion in judging the advisability of a proposed expansion.

2) Purchase of carbon offsets or RECs for Moffett will help to offset a difficult to reduce source of carbon emissions until such time as biofuels or other green technology becomes available for air vehicles.

Fiscal Impact

This recommendation will require some work by city staff to obtain the data from Moffett Field administration and from ICLEI, and to put it into the community inventory. It should not require more than a morning's work of phone calls and work on the computer.

Obstacles

If NASA decides to conduct its own carbon inventory, Mountain View should revisit the issue, but should nevertheless continue to include carbon emissions from Moffett Field as a consideration in any local land use planning. If NASA then decides to adopt emission reduction goals or to offset the carbon from operations directly, Mountain View should work to ensure that Moffett is included into the goals or that carbon offsets or RECs are purchased directly by NASA for air traffic using Moffett.

A small portion of Moffett Field is located in Sunnyvale but since the runways are located in Mountain View, Mountain View should include the emissions, making sure to communicate with Sunnyvale on the topic to ensure that the emissions are not counted twice.

Partnerships

This will likely require working together with the Moffett Field administration to obtain fuel usage data, and briefly with the City of Sunnyvale.

Contact Information

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References and Notes

(1) http://gov.ca.gov/index.php?/press-release/4111/
(2) Per capita figure is determined by taking 2005 total emissions/Mountain View population
(3) Population numbers:

Population	1990	2000	2005	2008	2010	2012	2016	2020	2030	2050
City of Mountain View Dep. Of Finance	67500	70708	71890	73932	NA	NA	NA	NA	NA	NA
ABAG	67762	70877	71900	NA	75000	NA	NA	NA	88300	NA
General Plan	67460	70708	NA	NA	75200	NA	NA	NA	NA	NA
Extrapolated from ABAG 2010 and 2030 data =.82% growth rate						76234	78764	81378		

(4) This per capita number was calculated by taking 803,839 metric tons CO_2e divided by the 2012 anticipated population of 76,234 persons thus equaling 10.54 metric tons CO_2e per person.
(5) This per capita number was calculated by taking 761,531 metric tons CO_2e divided by the 2016 anticipated population of 78,764 persons thus equaling 9.67 metric tons CO_2e per person.
(6) This per capita number was calculated by taking 719,224 metric tons CO_2e divided by the 2020 anticipated population of 81,378 persons thus equaling 8.84 metric tons CO2e per person.
(7) http://www.portlandonline.com/shared/cfm/image.cfm?id=112118
(8) City of San Mateo Sustainable Initiatives Plan, Dec 17, 2007
(9) City of Berkeley Climate Action Plan, January 2008
(10) Palo Alto Climate Protection Plan, December 3, 2007
(11) http://www.sanjoseca.gov/greenvision/Sustainability.asp
(12) The current 2008 GHG emissions are assumed to be higher than the 2005 GHG emissions. This assumption is based on the fact that the population of Mountain View has increased by approximately 2500 people between 2005 and 2008 and that there has been little focused community-wide effort to curb GHG emissions. The current 2008 emissions were calculated by taking the 2005 11.77 metric tons per capita and multiplying it by the 2008 population. Thus 2008 Mountain View's GHG emissions will be 30,215 metric tons more than 2005 GHG emissions or have increased by 4%.
(13) Ideally, emissions from San Francisco's trash should show up on San Francisco's tally sheet and neither the original emissions nor the gradual tapering off of those emissions would affect Mountain View's tally sheet. Since the trash was dumped before the ICLEI measurements began, it is not counted like that. Emissions from Mountain View's trash dumped in Sunnyvale going forward from 2005 are counted as Mountain View emissions, though not those prior to 2005.
(14) http://www.bts.gov/publications/national_transportation_statistics/html/table_01_37.html
(15) For businesses, all travel by employees might be attributed to one place (the corporate headquarters) or might be spread across multiple locations, depending upon how ticket purchases are made. Unless companies play games by shifting corporate purchasing to offices outside states (such as California) that mandate emissions cuts, in the long run it won't matter whether purchases are assigned to a single corporate HQ or to separate offices.

Appendix 1

The table below shows two sets of numbers:

(1) The projected GHG emissions by Sector and Source for 2008, 2012, 2016 and 2020 if these emissions were to grow at the current per capita rate of 11.77 metric tons and in the exact same proportions as the baseline 2005 emissions.
(2) The projected GHG emissions if every sector or source reduced its emissions by 5%, 10% and 15%.

	Baseline Year				
Emissions by Sector **Business as Usual**	**2005**	2008	2012	2016	2020
Residental	**100,431**	103,284	106,500	110,034	113,686
Commercial	**160,273**	164,825	169,958	175,598	181,426
Industrial	**46,234**	47,547	49,028	50,655	52,336
Transportation	**421,428**	433,398	446,893	461,724	477,048
Waste	**117,780**	121,125	124,897	129,042	133,325
Total	**846,146**	870,180	897,275	927,053	957,820
Emissions by Source **Business as Usual**					
Electricity	**185,682**	190,956	196,902	203,437	210,188
Natural Gas	**121,256**	124,700	128,583	132,850	137,259
Gasoline and Diesel	**421,428**	433,398	446,893	461,724	477,048
Waste Decomposition	**14,923**	15,347	15,825	16,350	16,893
Landfill Waste	**102,857**	105,779	109,072	112,692	116,432
Total	**846,146**	870,180	897,275	927,053	957,820
Emission Reduction Goals by Sector					
			5%	10%	15%
Residental	**100,431**		95,409	90,388	85,366
Commercial	**160,273**		152,259	144,246	136,232
Industrial	**46,234**		43,922	41,611	39,299
Transportation	**421,428**		400,357	379,285	358,214
Waste	**117,780**		111,891	106,002	100,113
Total	**846,146**		803,839	761,531	719,224
Emission Reduction Goals by Source					
Electricity	**185,682**		176,398	167,114	157,830
Natural Gas	**121,256**		115,193	109,130	103,068
Gasoline and Diesel	**421,428**		400,357	379,285	358,214
Waste Decomposition	**14,923**		14,177	13,431	12,685
Landfill Waste	**102,857**		97,714	92,571	87,428
Total	**846,146**		803,839	761,531	719,224

Appendix 2

Calculations for Estimating Mountain View Airline Travel Carbon Emissions

Mountain View's population: 73,000
U.S. population: 300,000,000
U.S. passenger miles (year 2005): 584 billion miles.
CarbonConcierge estimates 0.616 pounds of CO2 per passenger mile.

This works out to about 0.6 metric tons per person, or about 42,000 metric tons for all the residents in the city. If CO2e emissions are 11-12 tons per person, then air travel accounts for about 5% of Mountain View's emissions.

This is probably a substantial underestimate because per-capita income in Mountain View is higher than the national average and therefore the number of miles flown per resident is almost certainly higher than the national average. Furthermore, high-tech business employees probably do more air travel than do most other businesses, so businesses in the city probably account for more than their "fair share" of U.S. business air travel.